REMARKS/ARGUMENTS

Favorable reconsideration of this application is respectfully requested.

Claims 1, 2 and 5-20 are present in this application. Claims 13-20 added by way of the present amendment are supported by the non-limiting disclosure on pages 18-22 and Figs. 11-16.

Under 35 U.S.C. § 103(a), claims 1, 2 and 6-11 are rejected over U.S. 2002/0090058 (Yasuda et al.) in view of U.S. 5,386,450 (Ozawa), claim 5 is rejected over Yasuda et al. and Ozawa and further in view of U.S. 2003/0169847 (Karellas et al.), and claims 8 and 10-12 rejected over Yasuda et al. and Ozawa and further in view of U.S. 4,766,603 (Okabe et al.).

The present invention is directed to an x-ray diagnostic system and a method of x-ray imaging performed by an x-ray diagnostic system. In the system, a fluoroscopic scan unit is configured to relatively move a table top and a support apparatus with respect to each other to form a fluoroscopic scan along a direction along which an x-ray contrast agent flows. An imaging parameter setting unit is configured to set parameters required for an image scan on the basis of the fluoroscopic image. The unit includes means for setting a relative moving speed of one of the tabletop and support apparatus with respect to the other depending on the speed of the x-ray contrast agent flowing in the object, and means for producing a difference image of two images of the object containing the contrast agent at two different positions in the object, and determining an amount of movement of the contrast agent using the difference image. The apparatus is thus able to allow the imaging to follow the movement of the contrast agent to maximize the efficiency of the x-ray scanning and relieve a burden on an operator otherwise having to manually follow the movement of the contrast agent. In the method, the tabletop and the support apparatus are moved with respect to each other while performing a fluoroscopic scan along a direction along which the x-ray contrast agent flows, a difference image of two images of the object containing the x-ray contrast agent at two

different positions in the object are produced, and a moving speed of the x-ray contrast agent is determined using the difference image. Such a method and system are not disclosed or suggested by the cited prior art.

Turning to the § 103(a) rejections, the Office Action relies upon Yasuda et al. to disclose an x-ray diagnostic system but finds that there is no disclosure in Yasuda et al. of determining a relative moving speed that "will match that of the contrast agent flowing in the object," as stated on page 3 of the Office Action. The Office Action looks to Ozawa to teach moving a bed according to the flow of a contrast medium. Column 5 of Ozawa, beginning at line 25, describes the algorithm used to trace the contrast medium in blood vessels on a temporal difference image. A tracing unit 13 traces a contrast medium in blood vessels. As shown in Figure 7(a), a square having corners c1, c2, c3 and c4 is defined around a tracing start point a. A graph of the image density levels at the sides of the square is prepared (Figure 7(b)), and point b having a maximum concentration level above a pre-determined level is selected according to the image concentration distribution. Point b is set at the center of the blood vessel to be traced and point b is set as a new tracing start point, and the tracing process is repeated. The steps are repeated to trace the contrast medium injected into the blood vessels of the patient.

The difference image is produced by subtracting live images L1 or L3 from live image L2, where all of the images are obtained at the same bed position. In contrast, in the system of claim 1, the image parameter setting unit contains means for producing a difference image of two images of the object containing the x-ray contrast agent in two different positions of the object and determining an amount of movement of the x-ray contrast agent using the difference image. There is no disclosure or suggestion in Ozawa of any system where a difference image used to determine an amount of movement of an x-ray contrast agent is determined from two images of an object containing an x-ray contrast at two

different positions in the object. It is therefore respectfully submitted that claim 1 is patently distinguishable over a combination of Yasuda et al. and Ozawa.

In the method of claim 12, a difference image is produced of two images of the object containing the x-ray agent at two different positions in the object, and a moving amount of the x-ray contrast agent is determined using the difference image. It is clear from the discussion of Ozawa provided above, that there is no disclosure of a method having such steps since the difference image in Ozawa is produced using live images at the same bed position. Accordingly, claim 12 is also patently distinguishable over a combination of Yasuda et al. and Ozawa.

Karellas et al. is also cited for a system and method of moving a patient table and tracking the movement of a contrast agent. Karellas et al. does not provide any details as to the method of tracking the contrast agent, but it is clear that there is no disclosure of a system as recited in claim 1, where a difference image obtained from two images of the object at two different positions in the object is used to determine a movement amount by a parameter setting unit as recited in claim 1, or a method having steps of producing the difference image and determining an amount of movement of the x-ray contrast agent using the difference image as recited in claim 12. Claims 1 and 12 are also patently distinguishable over a combination of Yasuda et al., Ozawa and Karellas et al.

Okabe et al. is cited for an aperture collimator device that controls a radiation field that is precisely identical with a predetermined area of a fluoroscopic scan. Even if such teachings could be combined with Yasuda et al. and Ozawa, the combination would still fail to disclose or suggest the method of claim 12 with the system of claim 1, since Okabe et al. does not remedy the deficiencies noted above in Yasuda et al. and Ozawa. Accordingly, claims 1 and 12 are also patently distinguishable over a combination of Yasuda et al., Ozawa and Okabe et al.

It is respectfully submitted that the present application is in condition for allowance and a favorable action to that effect is respectfully requested.

Respectfully submitted,

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